

CLAIMS:

1. A projection system for projecting an image onto a projection surface (12), the projection system comprising:

(a) a light source (14) for supplying light;

(b) an optical element (16) for gathering and focusing said light, thereby providing a light beam (26);

(c) a first reflective polarizer (30) for polarizing said light beam (26), thereby generating a polarized light beam (32);

characterized in that the projection system further comprises:

(d) a transmissive display panel (36) for receiving said polarized light beam (32) and for manipulating said polarized light beam (32), thereby encoding image information on said polarized light beam and generating an encoded light beam (38);

(e) means for controlling each pixel of said transmissive display panel so as to control manipulation of said polarized light beam (38); and

(f) a second reflective polarizer (40) for rejecting unwanted polarizations of said encoded light beam (38) and for transmitting desired polarization of said encoded light beam (38) to said projection surface (12).

2. A projection system as claimed in claim 1, wherein said first and second reflective polarizers comprise wire-grid polarizers, cholesteric polarizers, interference films, holographic structures, stacks of thin birefringent films, beam splitters, mirrors, or any combination thereof.

3. A projection system as claimed in claim 1 or 2, wherein said second reflective polarizer (40) is oriented with respect to said encoded light beam at incident angles in the range between approximately 30° and 60°, such as incident angles of 35°, 45° or 55°.

4. A projection system as claimed in any one of claims 1 to 3, wherein said projection system is realised by folding the light path from said light source (14) to the projection surface (12) in a two-layer structure.

5. A projection system as claimed in any one of claims 1 to 4, wherein said transmissive display panel (36) comprises an electro-optical medium such as liquid crystal or plasma, or electrochromic or electrophoretic elements, light-emitting elements, organic or inorganic light-emitting elements, polymer light-emitting elements, or any combination thereof.
6. A projection system as claimed in any one of claims 1 to 5, wherein said means for controlling each pixel of said transmissive display panel (36) is implemented by using a processor.
7. A projection system as claimed in any of claims 1 to 6, wherein said means for controlling each pixel may be incorporated on said transmissive display panel substrate.
8. A projection system as claimed in any one of claims 1 to 7, further comprising an optical element (16) for gathering said light from said light source (14) and having an exit surface (20) adjacent to a colour separation prism (22) having an entrance surface (24) which is substantially equal to said exit surface (20).
9. A projection system as claimed in claim 8, wherein said colour separation prism (22) is adapted to separate said light supplied by said light source (14) into red, green and blue coloured light.
10. A projection system as claimed in any one of claims 1 to 9, wherein said transmissive display panel (36) comprises a first (36a), second (36b) and third (36c) transmissive display panel unit, respectively.
11. A projection system as claimed in any one of claims 8 to 10, wherein said colour separation prism (22) is adapted to communicate red, green and blue coloured light to said first (36a), second (36b) and third (36c) transmissive display panel units.
12. A projection system as claimed in any one of claims 1 to 11, further comprising a recombination prism (44) for recombining encoded light beams into a single encoded light beam.

13. A projection system as claimed in claim 12, wherein said recombination prism (44) is adapted to receive encoded red, green and blue light from said first (36a), second (36b) and third (36c) transmissive display panel units, and said recombination prism (44) recombining said encoded red, green and blue light into a single encoded light beam to be projected through a projection lens (46) onto said projection surface (12).
14. A projection system as claimed in any one of claims 11 to 13, further comprising focusing lenses (52a, 52b, 52c and 54a) for focusing said encoded light before said colour recombination prism (44).
15. A projection system as claimed in any one of claims 1 to 14, further comprising magnifying lenses (26, 34) for providing a polarized light beam covering the full surface of said transmissive display panel (36).